

Smoke & Air Quality: Burning Issues in the NW



Clean Air Act Seminar: June 20, 2002
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Overview

- Smoke and the Clean Air Act
- Fire and Smoke Policies
- Smoke Management
- Agricultural Field Burning Strategy
- Litigation
- Future Smoke

Smoke & the CAA

- National Ambient Air Quality Standards
 - NAAQS (Section 109)
- Implementation Plans
 - SIPs, FIPs, and TIPs (Section 110)
 - Nonattainment Areas (Section 107)
 - PSD: Prev. of Significant Deterioration (Part C)
 - Conformity (Section 176)

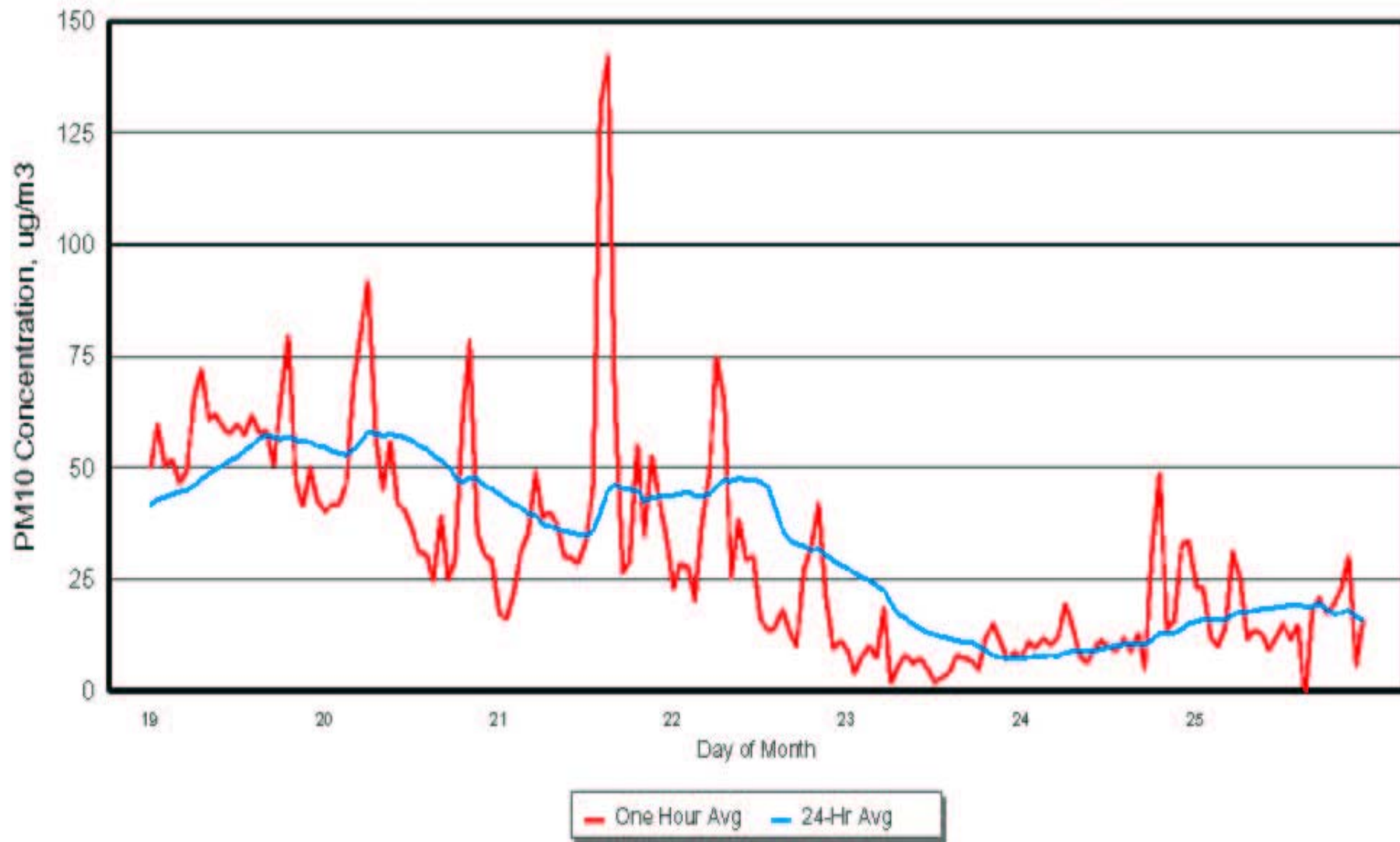
Smoke & the CAA (cont)

- Visibility (Section 169)
 - Regional Haze Rule
- Emergency Powers (Section 303)
- Citizen Suits (Section 304)

NAAQS and Smoke

- Criteria Pollutant: Particulate Matter
 - PM 10; 150 $\mu\text{g}/\text{m}^3$ /24-hour avg (50 annual)
 - PM 2.5; 65 $\mu\text{g}/\text{m}^3$; 24-hour avg (15 annual)
- Smoke levels seldom exceeds 24-hour avg, especially from field burning
- High peak levels, but short term exposure

Sandpoint PM10 TEOM Data
One-Hour and 24-Hr Concentrations for August 19 to 25, 2001



Unofficial Data

Implementation Plans

- Approved and enforceable by EPA
- Smoke management plans, open burning rules, etc., used in SIPs to minimize impacts in Nonattainment Areas (NA) or statewide
- PSD: increased fire activity could exceed allowable increments for PM in an attainment area
- Conformity: for fire activity within NA area

Regional Haze Rule

- Protect/restore visibility in Class I Areas
- New SIPs and technical tools are being developed to control & track smoke emissions
- Western Regional Air Partnership (WRAP)
 - Regional Planning Organization for states/tribes
 - Fire Emissions Joint Forum
 - Task Teams (several) working on various aspects

Hope, Idaho
Now you see it ...



Now you don't



Emergency Powers & Citizen Suits

- Section 303: Broad authority for EPA to intervene if pollution source presents “imminent and substantial endangerment to public health”
- Section 304: Citizen suits allowed for specific violations (emission std/limit, SIP, permit, breach of EPA duty)

Other Important Linkages

- NEPA
 - Forest plans with prescribed fire need to address air quality impacts
- National Fire Plan
 - \$: billions allocated to USDA FS and DOI
 - focus on wildfire fighting and prevention
 - increase in prescribed forest burns

National Policy Approach

- EPA recognizes need to use fire as efficient and economical land management tool
 - restore forest ecosystem health
 - prevent catastrophic wildfires
 - range management
 - crop production

Smoke Management Plans (SMPs)

EPA encourages the use of SMPs to minimize the impacts of burning activities:

- Public health (NAAQS violations)
- Public welfare
 - nuisance smoke
 - public safety hazards
 - visibility

EPA Smoke Policies

- Interim Air Quality Policy on Wildland and Prescribed Fires (May 1998)
 - EPA can use discretion not to designate area as nonattainment due to NAAQS violation if effective SMP is in place
- Natural Events Policy (May 1996)
 - same discretion if state has Natural Events Action Plan for wildfires in place

Smoke Management Elements

1. Reduce and Control Emissions

- alternatives to fire
- best management practices
- authorization to burn

Smoke Management Elements

2. Mitigate Impacts

- limit amount, location, timing of burns
- evaluate smoke dispersion (weather)
- air quality modeling and monitoring

Smoke Management Elements

3. Operational Components

- public notice and education
- evaluation (complaints, air impacts)
- enforcement
- regional coordination

Smoke Management: Friend or Foe?

- Many skeptics of “smoke targeting”
 - Burn when wind blows away from large population centers (and AQ monitors)
 - toward smaller towns and rural areas
- Growing population in some farm areas are limiting options
- Even with best technology, unexpected wind shifts can lead to smoke intrusions

Agricultural Field Burning

It can start here ...



but drift ...



... here



Why is EPA picking on Ag?

Prescribed forest burning programs:

- Generally more mature and technically sophisticated than field burning programs
- In more remote locations
- Less complaints
- Public benefits

Why do farmers burn?

Fire is a cheap, easy, and effective way to:

- Dispose of unwanted crop residue
- Ease seeding and tilling operations
- Sanitize fields (crops pests and diseases)
- Increase crop yield ($\sim 30\%$ for grass seed)

What's burned where in R10?

- Crop residues are routinely burned in many Northwest farming areas:
 - Eastern Washington (wheat)
 - North Idaho (grass and wheat)
 - Coeur d'Alene and Nez Perce tribal lands
 - Willamette Valley, Oregon (grass)
 - Northeast Oregon (wheat and grass)

Who's in Charge?

- WA: permit & enforcement program run by Ecology and delegated entities
- ID: new statewide rule to register fields run by State Ag Dept. with IDEQ input
- OR: westside run by State Ag, eastside by individual counties
- Tribal: wide range of programs

Why is EPA Involved in AgB?

- Public Health & Welfare Concerns
- Uneven Controls Across the Region
- Value of Regional Leadership
- Litigation in Washington and Idaho
- Hundreds of complaints

What are people saying?

- Smoke is so heavy, I can't breathe or see
- Wife has asthma and can't even go outside
- 81-year old mother is having trouble breathing
- 7-year old neighbor is going to the hospital
- The ER is full of smoke!
- My clients say they'll never come back here
- If this were a factory belching this smoke, EPA would shut it down in a heartbeat!



Health Concerns

- Fine particulate matter (PM) exposure is linked with serious health impacts
 - aggravated asthma and bronchitis
 - coughing and difficult breathing
 - decreased lung function
 - disrupted heart rate and rhythm
 - premature death

Who is most Vulnerable?


- Asthmatics
- Children
- Elderly (>65years)
- Individuals with pre-existing cardiopulmonary disease such as COPD & cardiovascular disease

Public Welfare Concerns

- Visibility impairment
- Nuisance smoke, such as odors
- Economic: business, tourism, real estate
- Public Safety
 - 1988 Oregon I-5 accident; 7 died, 38 injured

Regional AgB Strategy (Oct '00)

- Framework for long-term solutions
- Public health goal: no endangerment
- Minimize environmental impacts
- Approach
 - work closely with partners & stakeholders
 - primary responsibility with others
 - however ...

A photograph of a gorilla in its natural habitat, with two green speech bubbles overlaid. The gorilla is looking towards the camera. The background is a blurred natural setting with trees and foliage.

We expect
reasonable
progress, or ...

We might take
Federal action

A Non-Regulatory Focus

- Problem-solver
- Capacity-builder
- Community-based player
- Facilitator
- Regional leader (cross-border/inter-agency)

R10 Strategy Objectives

- 1) Understand issues and roles
- 2) Reduce burning w/ alternatives & incentives
- 3) Improve programs that control/limit smoke
- 4) Enhance AQ monitoring & emissions science
- 5) Further smoke and health research
- 6) Track and measure progress

Field Burning Team

- OAQ - lead office
- ORC - litigation, mediation, enforcement
- OEA - emissions, monitoring, risk, meteorology, economic
- ORD - health consultation and research
- ECO - outreach, place-based, ag sector, forest team, NEPA
- OI - forums design
- EXA - media, congressional
- EPA state offices
- ATSDR - public health

Obj 1: Unique EPA Roles

- Cross-border smoke transport/impacts
- Interagency coordination
- Tribal lands CAA responsibility
- Financial & technical assistance
- Keep pressure on for progress
- Facilitative leadership

Stakeholder Forums

January to May, 2001

Coeur d'Alene, Pendleton, Moscow, Pasco

~ 300 participants total



The Stakeholders

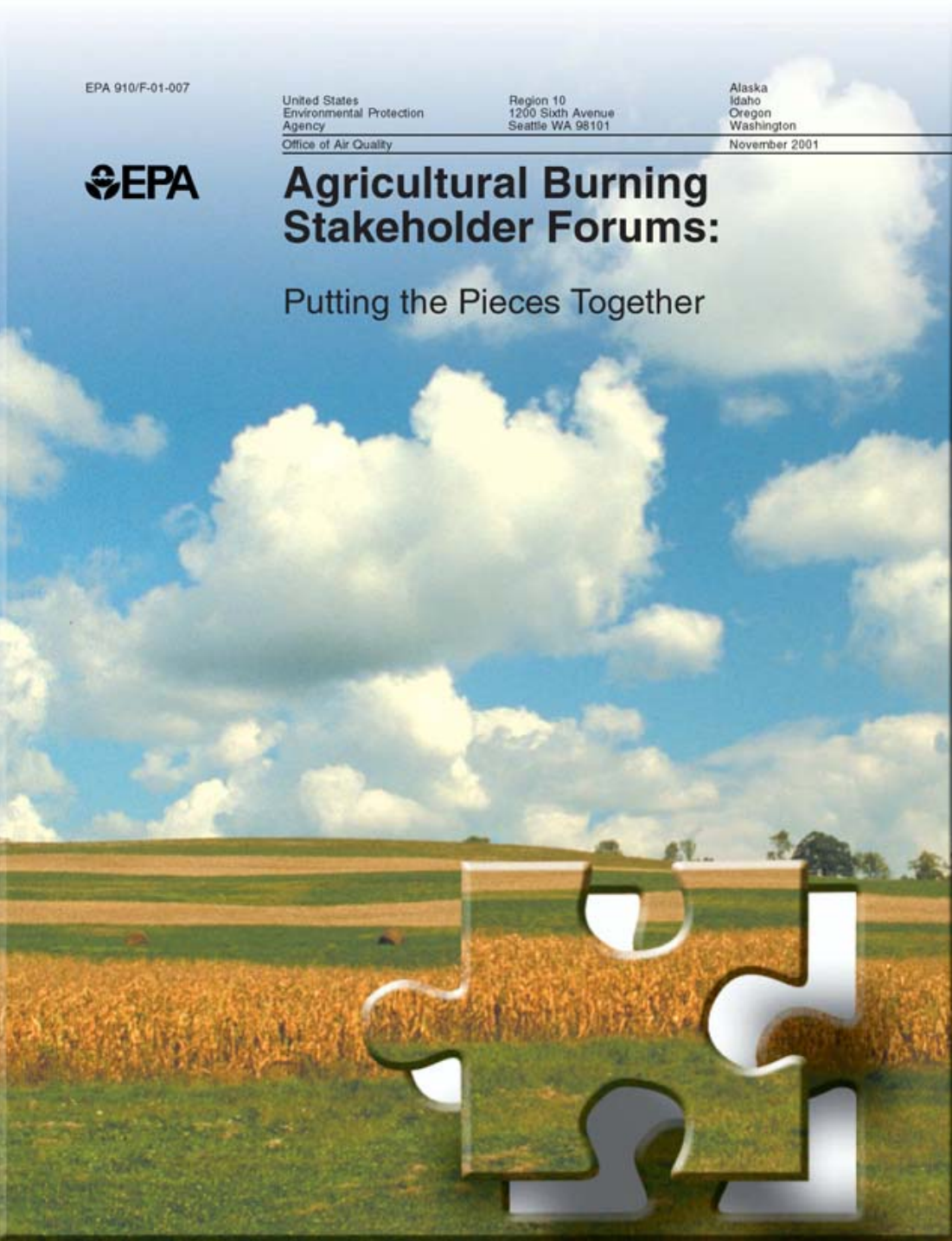
- Agriculture
 - farmers, ag associations, conservation districts, cooperative extension, researchers
- Impacted Public/Health Community
 - concerned and sensitive populations
 - doctors, scientists, health agencies/organizations
- Government
 - regulators (EPA, state, local, tribal)
 - elected officials





Agricultural Burning Stakeholder Forums:

Putting the Pieces Together



Forums Report

- Summarized key messages heard and efforts to find solutions
- Appendix 2 - Table of projects funded by EPA:
- \$2,000,000
- 25 projects!

What did we hear?

- **Agriculture:** want fire in toolbox; some use as last resort; some need for economic viability; research into alternatives; incentives.
- **Health:** more research into short-term exposure; provide an “early-warning” system.
- **Government:** limited ability to regulate ag; new programs being developed to control burning, track emissions, and inform public.

Obj 2: Reduce Amt. of Burning

- Support research & demo of alternatives
- Residue management (leave on field)
 - Direct Seed farming (no-till/min-till) builds soil quality, reduces erosion, controls dust
- Residue removal
 - cut, bale, and remove
 - sell as animal feed, bio-fiber products, etc.

Burning Trend

- WA: certified alternatives to burning grass seed residue in 1998: virtually banned
- OR: has reduced grass burning from 315,000 acres ('68) to 50,000 acres ('01)
- ID: increase on CdA Tribal Reservation
- EPA funding study of alternatives with CdA, Nez Perce, & Univ. of Idaho

Barriers to More Progress

- Cultural: Ag community slow to change
 - 1969: “*We realize we’ll have to give up burning in the foreseeable future*”
- Economic Risk: Change = \$
- Political: Ag lobby resistance
- Enviro benefits of burning touted
 - grass crops protect water quality
 - land use: want farms or strip malls?

Obj 3: Improve Programs

- Goal: at least basic-level SMPs in place
- Where needed, enhanced enforceable SMPs
- Innovative approaches on the way:
 - web-based permits and GIS mapping
 - metering (stagger time, place, amount of burns)
 - airshed models
 - information-sharing and burn decisions tools



Web-Based
Burning
Information
System

Collaborative
project of:

USFS BlueSky
and
EPA RAINS

What is BlueSky?

Emissions Data (Ag, Forest, etc.)

PLUS

Meteorology (MM5)

PLUS

Trajectory/Dispersion Models



Predict Plumes

RAINS - Map Finder

Background Map Themes

To change themes, select from the list below and click 'Go'.

Gray Relief

Go

Find an Area

Counties

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(select from the list or click navigation bar)

+ State Links:

+ Federal Links:

State of Washington



Legend

- Area Boundary
- Streams
- Water bodies

0 ————— 189 Miles

Albers Projection

Washington - Registered and planned burns - all future

7/2/01 4:00:31 AM

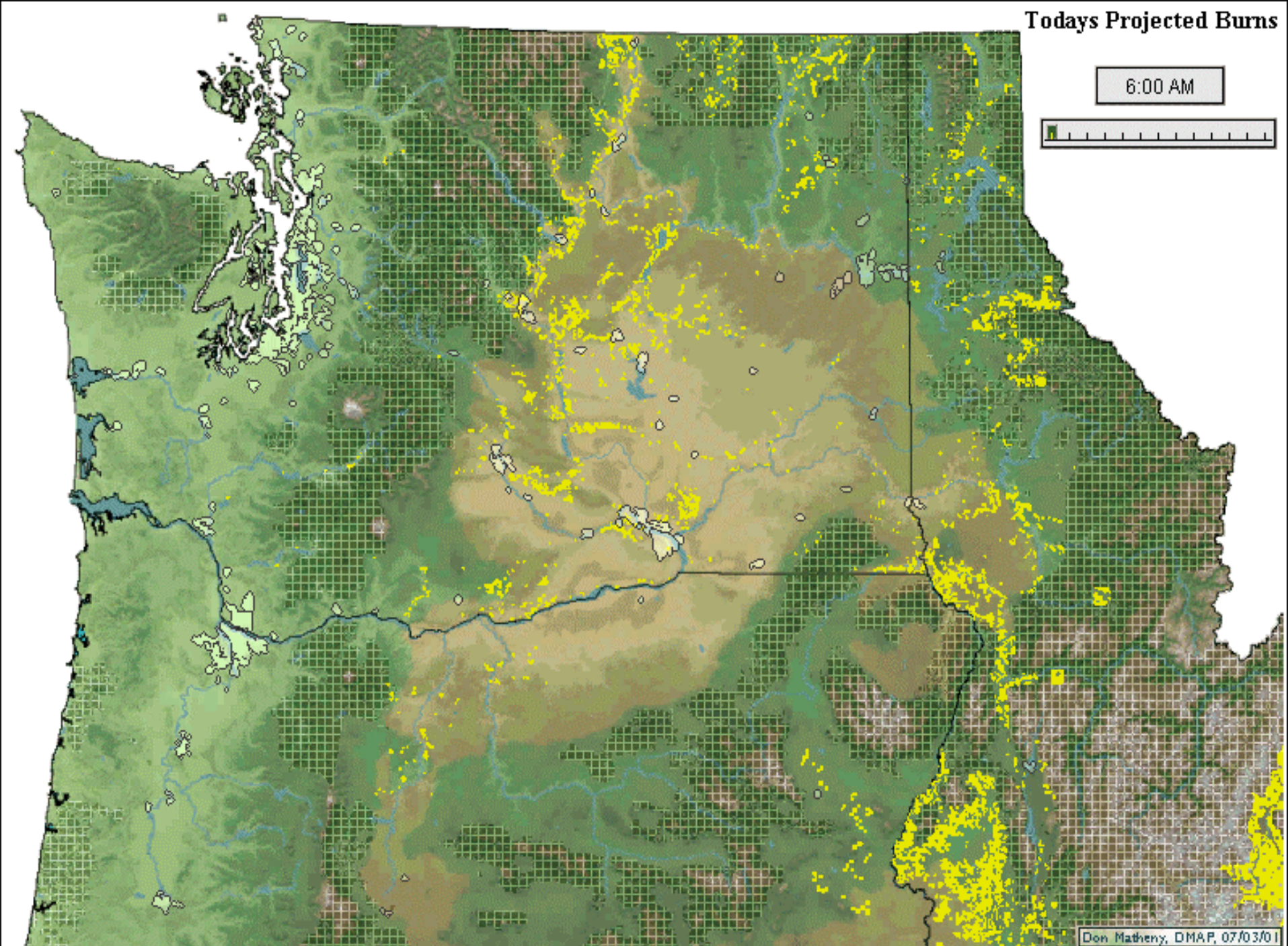
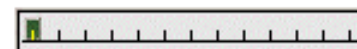
State	County	Org	Unit	Burn Date	Burn Type	Burn Acres	Legal	Elev	Burn Method	Burn Duration	Landing Tons	Pile Tons	Unit Tons	Total Tons	Activity Comment	Burn Comment
WA	19 - Ferry	062104-Republic Ranger District	Berton T #1	10/1/01 12:00:00 PM	N-Underburn Natural	60	T 39 N, R 33 E, Sec 33	3500	Hand	240	0	0	3	3		
WA	19 - Ferry	062104-Republic Ranger District	Eagle Rock BC #1	10/15/01 12:00:00 PM	U-Underburn Activity	2000	T 35 N, R 33 E, Sec 29	2700	Combination hand and aerial	300	0	0	11	11	400 acres of B burned fall of 1999.	

FASTRACS

<http://www.fs.fed.us/r6/fire/smoke.htm>

Today's Projected Burns

6:00 AM



Obj 4: Monitoring



Trend toward:

- More monitors in rural areas
- Real-time data
 - for burn mangers and public
- On-the-web via Air Quality Index (AQI)

Obj 4: Emissions Science

- Study of Hydrocarbons, Irritating and Toxic Phenols, and other Biological Toxics in Smoke from Burning Wheat Stubble, \$72,226, Jeff Corkill, PhD, jcorkill@ewu.edu & Claiborn, WSU
- Cereal-Grain Crop Open-Field Burning Emissions Study, \$45,134, WA Dept. of Ecology, Karen Wood, kwoo461@ecy.wa.gov, Air Sciences
- Quantifying Post-Harvest Emissions from Grass Field Burning, \$12,500, Bill Johnston, PhD, johnston@wsu.edu

Smoke contains gases, PM, toxics

- Gases: CO, HC, NO_x, SO₂, CH₄
- PM: mostly fine, with attached -
- Toxic irritants and carcinogens from incomplete combustion:
 - PBTs (Persistent Bioaccumulative Toxics)
 - Benzo (a) pyrene (BaP) compounds
 - Polyaromatic hydrocarbons (PAHs) + others
 - VOCs: phenols

Vegetative vs. Fossil Fuel Combustion

- Plant materials produce more oxygenated organic compounds that may be irritating
- But, lower concentrations of carcinogenic PAHs than fossil fuel combustion so possibly lower cancer risk

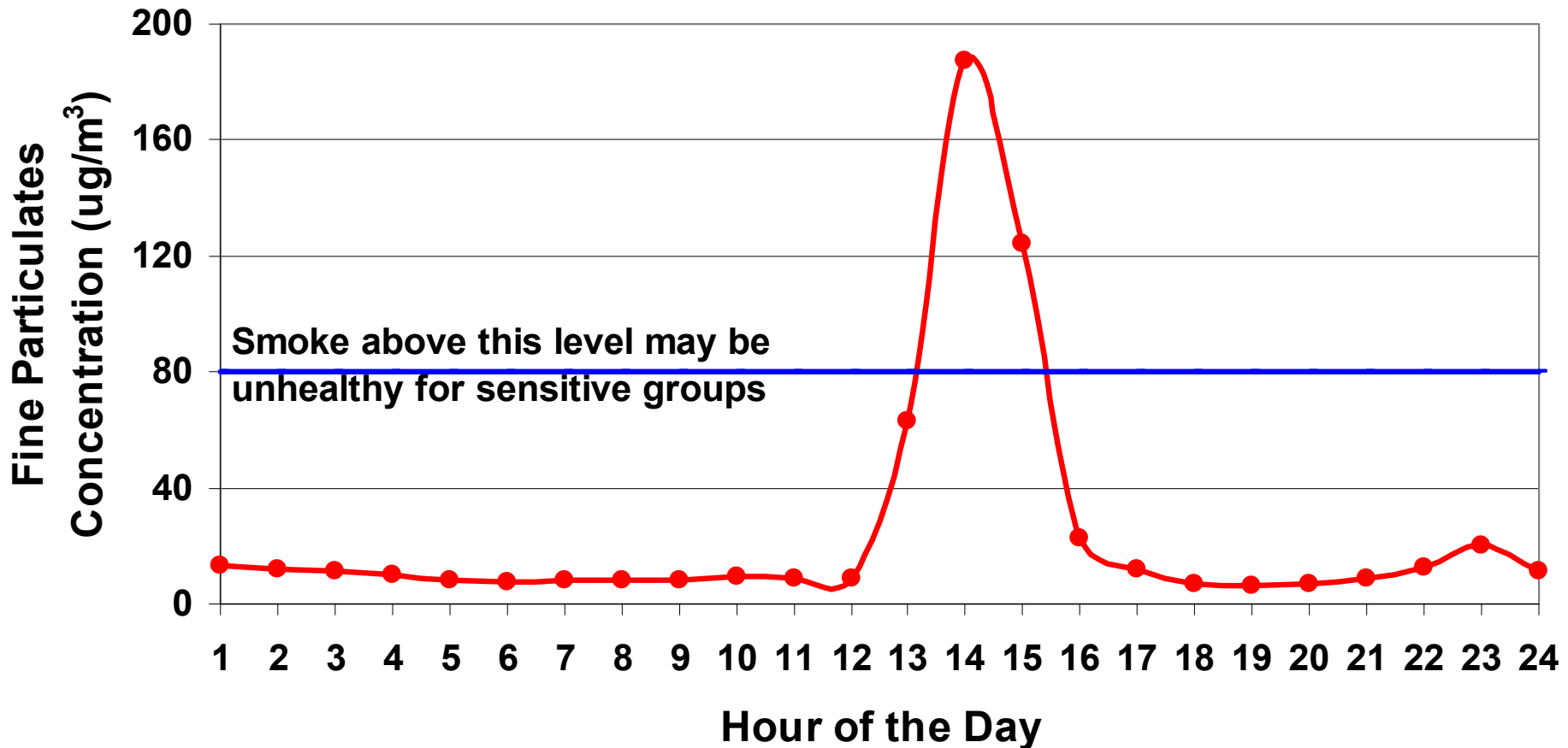
Obj 5: Smoke and Health

- **High-level short-term exposure effects**
 - Region 10 raising as big concern
 - an increasing focus of research
- Short-term standard unlikely soon
- New PM Criteria Document does include a section on short-term exposure studies
- Site-specific health outcomes data lacking

PM Action-Levels

- States/Tribes can adopt action-levels
- No “magic number” yet for effects
- Idaho emergency episode rule:
80 $\mu\text{g}/\text{m}^3$, PM-2.5, 1-hour average

Air Quality Impact from Field Burning



Concentration of fine particulates measured about one hour and ten miles downwind from field burning event of over 2,000 acres; August 21, 2001.
(Source - Idaho Department of Environmental Quality)

Smoke and Health Resources

- EPA Northwest Research Center for Particulate Air Pollution and Health
 - The “PM-Center” at UW
- Fire, Smoke and Health Workshop (2001)
 - www.firesmokehealth.org
- Town meetings in impacted areas (2002)
- WA AgB health assessment on the way



Wildfire Smoke

A Guide for Public Health
Officials



<http://depts.washington.edu/wildfire/outreach.html>

Smoke Index based on:



Categories	Visibility in Miles	Particulate matter levels* (1hour average, $\mu\text{g}/\text{m}^3$)
Good	10 miles and up	0 - 40
Moderate	6 to 9	41 - 80
Unhealthy for Sensitive Groups	3 to 5	81 - 175
Unhealthy	1 1/2 to 2 1/2	176 - 300
Very Unhealthy	1 to 1 1/4	301 - 500
Hazardous	3/4 mile or less	over 500

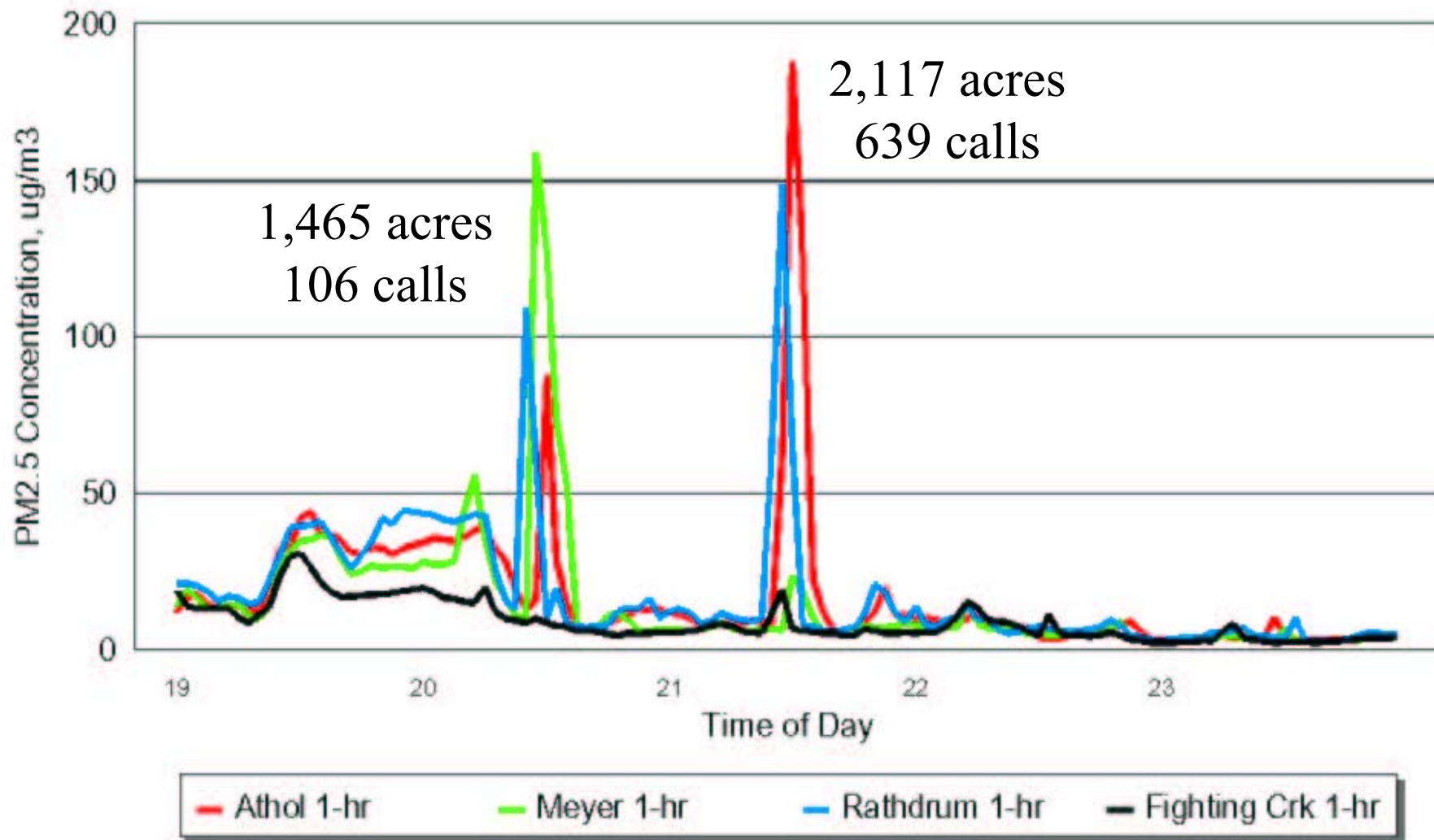
Obj 6: Measuring Progress

Common Indicators:

- Monitoring data
- Acres burned
- Complaints

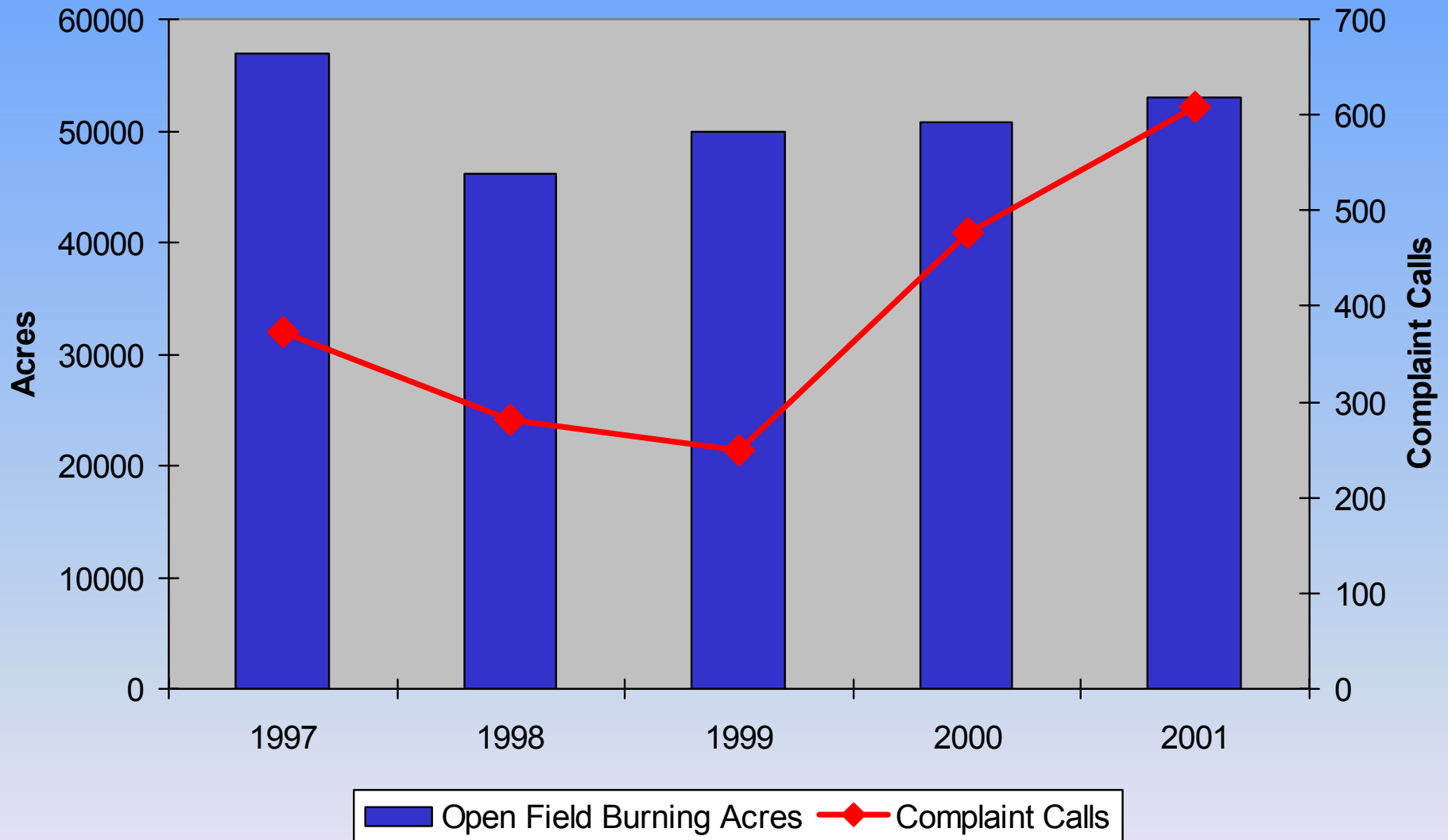
2001 Nephelometer Data

One-Hour Averages August 19 to August 23



Unofficial Data

Field Burning Acres and Complaints: Willamette Valley, Oregon



Source: Oregon Department of Agriculture, Summary of the 2001 Field Burning Season



Ag Burning Litigation

- Communities fed up with repeated smoke intrusions (decades) and lack of progress
- Interest groups formed to stop field burning
 - Save Our Summers (SOS)
 - Safe Air for Everyone (SAFE)
- Educating public, agencies, elected officials
- Innovative lawsuits under ADA and RCRA

Save Our Summers (SOS)

- Tri-state citizen's group sues WA Ecology and Idaho in federal court under American with Disabilities Act (ADA) March '99
- Plaintiffs with respiratory disabilities allege smoke prevents use of public facilities (schools, roads, parks, etc.)
- Controversy over jurisdiction
 - ADA or CAA???

The ADA Case

- EPA funds/participates in mediation (Mar 00)
- Agreement reached, then repudiated (Aug 00)
- SOS-Ecology settlement reached (Nov 01)
 - Enhanced web-based permitting
 - More public notice and AQ monitors
 - Ag research & BMP manual
 - Health study (\$100K)
 - Advisory Panel for study & rulemaking (2006)

Safe Air for Everyone (SAFE)

- Formed Sept. 2001 by Sandpoint physicians
 - 1,000+ members
- Seeking injunction against growers to stop burning of post-harvest residue in their grass seed fields:
 - 76 defendants
 - Rathdrum Prairie (~7,000 acres)
 - CdA Reservation (~30,000 acres)

Why North Idaho is Unique

- More complaints than other areas
 - > 1,700 in 2001 (Aug - Sept)
- Death attributed to grass smoke Sept 2000
 - possible other deaths, near-deaths
- Smoke management is difficult in airshed
 - growing population
 - topography, lakes
 - multiple jurisdictions

Resource Conservation and Recovery Act

- RCRA Section 7002: Citizen Suits
- Provides broad authority for courts to intervene when an endangerment to public health is created by the disposal, treatment, and handling of a “solid waste” ...
- Definition includes “discarded material ... resulting from ...agricultural operations”

EPA and the SAFE Suit

- EPA, State, and Tribe not a party
- EPA has been offering to fund/participate in mediation w/ SAFE, growers, state & tribe
- EPA authority under CAA and RCRA applies to both state and tribal lands

The SAFE Suit (cont.)

- We are assessing our federal options under different outcomes of the suit:
 - burning prohibited, mediation, or dismissed
- We have said that changes must be made to protect public health this burn season
- Could mean less burning and more controls
- Class action suit recently filed (personal inj)

What's Down the Road for Smoke and Air Quality?



Smoke Trek: The Next Generation

Transboundary Coordination

Emissions Data & Tracking

Regional Haze SIPs

Blue-Sky RAINS

Interagency Meetings

Alternatives to Burning

Health Research & Assessments

More Litigation

Tribal Air Rules

What
questions do
you have?

